EE 7203 SWITCH GEAR AND PROTECTION

MODULE – I

Circuit Breakers: Arc voltage, Mechanism of arc interruption, Restriking voltage and recovery voltage, Classification of CBs, Oil CBs, Air CBs, Vacuum CBs, Sf6 CBs, HVDC CBs, Rating and Testing of CBs.

(5)

MODULE – II

Protective Relaying: Introduction to protective relaying, Thermal relay, Over current relay, Directional relay, Differential relay.

(4)

MODULE – III

Transmission Line and Feeder Protection: Over current and directional relay applications, Distance protection using impedance relay, Reactance relay, MHO relay.

(5)

MODULE – IV

Generator Protection: Protection against stator and rotor faults and abnormal operating conditions such as unbalanced loading, loss of excitation, Over speeding.

(6)

MODULE – V

Transformer Protection: Types of faults, Over current protection, Differential protection, Differential relay with harmonic restraint, Protection against high resistance ground faults, Interturn faults, Bucholz relay.

(5)

MODULE – VI

Introduction Motor Protection: Protection against phase fault, ground fault and abnormal operating conditions such as single phasing, Phase reversal and overloading.

(5)

MODULE – VII

Introduction to Carrier: Aided Protection and Numerical Protection

(5)

Text Books:

1. Power System Protection & Switch Gear : Badriram and Vishwa Karma, TMH Publications.
2. Switch Gear and Protection Sunil S. Rao, Khanna Publications

Reference Books:

1. Power System Protection & Switch Gear: Ravindranath & Chander, New Age Publications.
2. The Art and Science of Protective Relaying: C. Russel Mason, Wiley Bastern Ltd.

MEE 1119 CONTROL SYSTEM DESIGN

Module 1:
Performance characteristics of feedback control system & design specification of control loop. Different types of control system applications and their functional requirement. Derivation of load-locus (toque/ speed characteristics of load). Selection of motors, sensors, drives. Choice of design domain & general guidelines for choice of domain. Controller configuration and choice of controller configuration for specific design requirement. Fundamental principles of control system design. Experimental evaluation of system dynamics in time domain and frequency domain.

Module 2:
Design with PD Controller: Time domain interpretation of PD controller, frequency domain interpretation of PD controller, summary of the effects of PD controller. Design with PI controller: Time domain interpretation of PI controller frequency domain interpretation of PI controller, summary of the effects of PI controller, design with PID controller, Ziegler Nichols tuning & other methods.

Module 3:
Design with lag/lead/lag-lead compensator, time domain interpretation of lag/lead/lag-lead compensator, frequency domain interpretation of lag/lead/lag-lead compensator, summary of the effects of lag/lead/lag-lead compensator.

Module 4:
Forward & feed-forward controller, minor loop feedback control, concept of robust design for control system, pole-zero cancellation design.

Module 5:
Sate feedback control, pole placement design through state feedback, state feedback with integral control, design state observer.

Module 6:
Design of Discrete Data Control System: Digital implementation of analog controller (PID) and lag-lead controllers, Design of discrete data control systems in frequency domain and Z plane.

Module 7:
Hardware and Software Implementation of Common Compensator: Physical realization of common compensator with active and passive elements, tunable PID algorithms- position and velocity algorithms.

Text Books:

1. B.C. Kuo, "Automatic Control System", 7th Edition PHI.
2. M. Gopal, "Control Systems Principles & Design", 2nd Edition, TMH.
3. J.G. Truxal, "Automatic Feedback Control System", McGraw Hill, New York.
4. K. Ogata, "Discrete Time Control Systems", 2nd Edition, Pearson Education.

Reference Books:

1. Norman Nise, "Control System Engineering", 4th Edition.
2. M. Gopal, "Digital Control & State Variable Method", TMH.
3. B.C. Kuo, "Digital Control System", 2nd Edition, Oxford

ME 7033 POWER PLANT ENGINEERING

Module 1: Introduction: Review of electricity generation in Indian context and energy scenario in India, Principal types of power plants, special feature, application and future trend of developments.
(5 Lectures)

Module 2: Steam Power Plants: Major components of power plant, fuels and their properties, storage, preparation, handling and burning, Ash handling and dust collection, Feed water treatment plants, cooling towers, insulation, Heat balance of power plant.
(5 Lectures)

Module 3: Nuclear Power Plants: Principle of power generation by nuclear fission and fusion, fuels for nuclear power plants, preparation and care, fertile materials and breeding, Different types of reactor, Breeder reactors, Radioactive waste disposal systems.
(5 Lectures)

Module 4: Diesel and Gas Turbine Power Plants: Introduction, field of use, air supply, and cleaning system, fuel storage and supply systems, cooling systems, lubricating and starting systems, Components of gas turbine power plant, Different arrangements of components, Optimum design of Gas turbine unit for combined cycle plant, comparative study of diesel and gas turbine plants.
(5 Lectures)

Module 5: Hydraulic Power Plants: Different types of hydraulic power plants, rain fall and run-off measurements and plotting of various curves for estimating power available with or without storage, Pump storage plant. (5 Lectures)

Module 6: Combined operation of different power plants: Introduction, Advantages of combined working, load division between power stations, storage type hydro-electric power plant in combination with steam plant, Coordination of different types of power plants, Instrumentation and control methods used in different types of power plant.
(5 Lectures)

Module 7: Economic Analysis: Difference between Base load and peak load plants, Different terms and definitions, Means of meeting the total load demand, Performance and operating characteristics of power plants, Load division, Tarrif method for Electrical Energy.
(5 Lectures)

Books:

1. Power Plant Engineering: by F.T. Morse.
2. Power Plant Engineering: by Arora & Domkundwar, Dhanpatrai Publication
3. Power Plant Engineering: by N.K.Nag, T.M. H. Publication
4. Power Plant Technology: by M.M.E. Wakil, McGraw Hill Publication.
5. Power Plant Engineering: by K.K. Ramalingam, Scitech Publications.

MSH 1103 **BUSINESS ETHICS** **Credit: 3**

MODULE-1

Introduction to business ethics, ethical principles in life, utilitarianism justice and fairness

MODULE-2

Social responsibility of business organisations

MODULE-3

Introduction to corporate governance

MODULE-4

Ethics of consumer protection, relevance of ethics in marketplace

MODULE-5

.Business and its internal constituencies, employee issues

MODULE-6

Indian value system and it`s utility in present context

Module-7

Roles and responsibilities of an individual in the present social context.

TEXT BOOKS:

1. Business Ethics concept and cases: Valesquez -TMH Publication
2. Human Values-A.N. Tripathi-New age Publication
3. Ethics in Management and Indian ethos-BiswanathGhosh-vikas publication
4. Ethics in Management-aryakumar-Anne books Pvt. limited

EE 8221 UTILISATION OF ELECTRICAL POWER

MODULE – I

Electric Traction: Introduction, Requirements of Ideal Traction System Supply system for electric traction, Train movement Energy consumption. Co-efficient of adhesion, The traction motors starting, Breaking of Traction motors.

(6)

MODULE – II

Speed Control of Traction Motor: Semiconductor converter controlled drives of Traction Motor, Chopper controlled DC traction motor drives. PWM Voltage source inverter (VSI) Induction motor drives, Load commutated inverter fed synchronous motor drivers, CSI squirrel Cage IM drive, PWM VSI Squirrel cage IM drive. Drives of Diesel Electric Traction Motors: Diesel Engine driven D.C Generator Feeding dc series motors. Diesel Engine driven three-phase alternator supplying dc motors.

(8)

MODULE – III

Heating & Welding: Introduction, Different methods of heating, Temperature control of resistance furnace, Induction heating, Dielectric heating, Electric welding, Different welding methods, current control of welding transformer, Ultrasonic and laser welding.

(7)

MODULE – IV

Illumination: Introduction, Nature of radiations, Definitions. Polar curve, Laws of Illumination, Luminous Efficacy, Source of light, Incandescent, Vapour, Flourescent Lighting calculations, Flood lighting, Street lighting.

(7)

MODULE – V

PLC: Introduction, Ladder diagram fundamentals of PLC: Introduction, Basic components and their symbol, Fundamentals of ladder diagram. PLC configurations. System Block Diagram, Update-solve the ladder Network.

(6)

MODULE – VI

Fundamental PLC Programming: Physical components Vs. Programme components, Internal Relays, Disagreement circuit. Ladder programme, Execution sequence, Flip-Flop circuits, Mnemonic programming code: AND ladder rung, Entering normally closed contracts, OR ladder rung, Simple branches, Complex branches.

(6)

MODULE – VII

Motor Control Circuit Components, Interlocking methods for reversing control, Sequence control, Schematic and wiring diagram for motor control circuits, Remote control operation of an IM, Motor driven pump for a water tank, automatic water level control, Sequence operation of motors with interlocking arrangements.

(6)

Text Books:

1. Generation, Distribution and Utilisation of Electric Power C.L. Wadhwa, Wiley - 1993.
2. Electrical Design and Estimating and costing - K.B.Raina and S.K.Bhattacyarya, Wiley Delhi - 1993.
3. Fundamentals of Electrical Drives , G.K.Dubey , Narosa publication,New Delhi

Reference Books:

1. Utilization of Electric Power, N.V. Suryanarayana, Wiley - 1994.
2. Utilization of Electric Power - Taylor.